

FORAGE SUITABILITY GROUP CLAYPAN

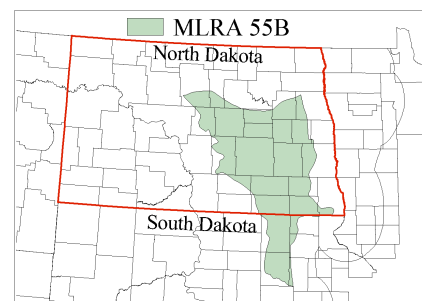
FSG No.: G055BY800ND

Major Land Resource Area: 55B - Central Black Glaciated Plains

Physiographic Features

The soils in this group are found on nearly level positions of till plains, lake plains, outwash plains, stream terraces, and flood plains.

| | <u>Minimum</u> | <u>Maximum</u> |
|--------------------------|----------------|----------------|
| Elevation (feet): | 980 | 1970 |
| Slope (percent): | 0 | 6 |
| Flooding: | | |
| Frequency: | None | Frequent |
| Duration: | None | Brief |
| Ponding: | | |
| Depth (inches): | | |
| Frequency: | None | None |
| Duration: | None | None |
| Runoff Class: | Low | High |



Climatic Features

This group occurs in a mid-continental climate characterized by wide seasonal temperature and precipitation fluctuations and extremes.

Annual precipitation varies widely from year to year in MLRA 55B. Average annual precipitation for all climate stations listed below is about 19 inches. About 78 percent of that occurs during the months of April through September. On average there are about 28 days with greater than .1 inches of precipitation during the same time frame. Precipitation is lowest in the northwest, and highest in the south in the MLRA.

Average annual snowfall ranges from 25 inches at Forman, North Dakota (ND), to 37 inches at Columbia, South Dakota (SD). Snow cover at depths greater than 1-inch range from 32 days at Petersburg, ND, to 98 days at Gackle, ND.

Average July temperatures are about 71°F and average January temperatures are about 7°F. Recorded temperature extremes in the MLRA during the years 1961 to 1990 are a low of -39 at both Petersburg and Oakes in ND, and a high of 114 recorded at Mellette, SD. The MLRA lies in USDA Plant Hardiness Zones 3b and 4a.

At Aberdeen, SD, the average annual wind speeds are about 11 mph. The highest wind speeds occur during March through May, but average monthly wind speeds do not vary significantly throughout the year. It is cloudy about 163 days a year. Average morning relative humidity in June is about 85 percent and average afternoon humidity is 60 percent.

The climate data listed in the tables below represent high and low ranges and averages for the climate stations and dates listed. For additional climate data access the National Water and Climate Center at <http://www.wcc.nrcs.usda.gov>.

| | From | To |
|---|-------------|-----------|
| Freeze-free period (28 deg)(days): (9 years in 10 at least) | 115 | 137 |
| Last Killing Freeze in Spring (28 deg): (1 year in 10 later than) | May 28 | May 14 |
| Last Frost in Spring (32 deg): (1 year in 10 later than) | Jun 06 | May 23 |
| First Frost in Fall (32 deg): (1 year in 10 earlier than) | Aug 29 | Sep 10 |

| | From Sep 08 | To Sep 21 |
|--|-----------------------|---------------------|
| First Killing Freeze in Fall (28 deg): (1 year in 10 earlier than) | | |
| Length of Growing Season (32 deg)(days): (9 years in 10 at least) | 92 | 116 |
| Growing Degree Days (40 deg): | 3389 | 4402 |
| Growing Degree Days (50 deg): | 1852 | 2558 |
| Annual Minimum Temperature: | -35 | -25 |
| Mean annual precipitation (inches): | 16 | 21 |

Monthly precipitation (inches) and temperature (F):

| | | | | | | | | | | | | |
|-------------------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 2 years in 10: | <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
| Precip. Less Than | 0.24 | 0.13 | 0.30 | 0.63 | 1.08 | 1.72 | 1.30 | 0.94 | 0.76 | 0.23 | 0.18 | 0.24 |
| Precip. More Than | 0.60 | 0.79 | 2.10 | 3.58 | 4.09 | 5.07 | 3.66 | 4.02 | 3.07 | 1.92 | 1.14 | 0.74 |
| Monthly Average: | 0.50 | 0.43 | 1.02 | 1.89 | 2.41 | 3.39 | 2.65 | 2.27 | 1.94 | 1.18 | 0.57 | 0.46 |
| Temp. Min. | -8.2 | -2.7 | 11.6 | 28.1 | 39.9 | 50.0 | 54.0 | 51.2 | 40.8 | 30.3 | 15.0 | -2.0 |
| Temp. Max. | 21.8 | 28.2 | 41.0 | 58.2 | 70.9 | 80.0 | 87.3 | 85.5 | 74.0 | 61.5 | 42.1 | 26.2 |
| Temp. Avg. | 7.4 | 13.6 | 26.9 | 42.8 | 55.7 | 65.4 | 71.0 | 68.7 | 57.6 | 45.8 | 28.3 | 12.9 |

| Climate Station | Location | From | To |
|------------------------|-----------------|-------------|-----------|
| ND2482 | Edgeley, ND | 1961 | 1990 |
| ND2605 | Oaks, ND | 1961 | 1987 |
| ND2605 | Ellendale, ND | 1961 | 1987 |
| ND2949 | Fessenden, ND | 1961 | 1990 |
| ND3117 | Forman, ND | 1961 | 1990 |
| ND3287 | Fullerton, ND | 1961 | 1990 |
| ND3309 | Gackle, ND | 1961 | 1990 |
| ND4343 | Hurdsfield, ND | 1961 | 1990 |
| ND4413 | Jamestown, ND | 1961 | 1990 |
| ND4937 | La Moure, ND | 1961 | 1990 |
| ND5764 | McVile, ND | 1961 | 1990 |
| ND7027 | Petersburg, ND | 1961 | 1990 |
| ND8937 | Valley City, ND | 1961 | 1990 |
| SD0020 | Aberdeen, SD | 1961 | 1990 |
| SD1873 | Columbia, SD | 1961 | 1990 |
| SD5456 | Mellette, SD | 1961 | 1990 |

Soil Interpretations

This group consists mostly of somewhat poorly and moderately well drained, moderately fine to moderately course textured soils formed from glacial till and glacial outwash sediments. They have claypan subsoils with slow or very slow permeability. The underlying material and lower part of the subsoil typically have high amounts of soluble salts and are alkaline.

| | | | |
|--|-------------------------|----------------|----------------|
| Drainage Class: | Somewhat poorly drained | To | Well drained |
| Permeability Class: | Very slow | To | Slow |
| (0 - 40 inches) | | | |
| Frost Action Class: | Moderate | To | High |
| | | <u>Minimum</u> | <u>Maximum</u> |
| Depth: | | 72 | |
| Surface Fragments >3" (% Cover): | | 0 | 3 |
| Organic Matter (percent): | | 1.0 | 8.0 |
| (surface layer) | | | |
| Electrical Conductivity (mmhos/cm): | | 2 | 16 |
| (0 - 24 inches) | | | |
| Sodium Absorption Ratio: | | 3 | 35 |
| (0 - 12 inches) | | | |

| | <u>Minimum</u> | <u>Maximum</u> |
|---|----------------|----------------|
| Soil Reaction (1:1) Water (pH): (0 - 12 inches) | 5.1 | 7.8 |
| Available Water Capacity (inches): (0 - 60 inches) | 3 | |
| Calcium Carbonate Equivalent (percent): (0 - 12 inches) | 0 | 28 |

Adapted Species List

The following forage species are considered adapted to grow on the soils in this group. Additional information concerning plant characteristics of a number of the listed species as well as individual cultivars of many of those species can be accessed on the web at <http://plants.usda.gov/>.

Cool Season Grasses

| | |
|-------------------------|---|
| Beardless wildrye | F |
| Crested wheatgrass | F |
| Dahurian wildrye | F |
| Green needlegrass | F |
| Intermediate wheatgrass | F |
| Newhy hybrid wheatgrass | F |
| Pubescent wheatgrass | F |
| Russian wildrye | F |
| Slender wheatgrass | F |
| Smooth brome grass | F |
| Tall wheatgrass | G |
| Western wheatgrass | G |

Warm Season Grasses

| | |
|------------|---|
| Blue grama | F |
|------------|---|

Legumes

| | |
|-------------|---|
| Alfalfa | F |
| Hairy vetch | F |
| Sweetclover | F |

G - Good adaptation for forage production on this group of soils in this MLRA

F - Fair adaptation but will not produce at its highest potential

Production Estimates

Production estimates listed here should only be used for making general management recommendations. Onsite production information should always be used for making detailed planning and management recommendations.

The high forage production estimates listed below are based on dense, vigorous stands of climatically adapted, superior performing cultivars. They are properly fertilized for high yields, and pest infestations are kept below economic thresholds. Mechanical harvests are managed to maintain stand life by cutting at appropriate stages of maturity and harvest intervals. If grazed, optimum beginning and ending grazing heights are adhered to. Adequate time is allowed for plant recovery before entering winter dormancy under both uses.

The production estimates listed below represent total annual above ground plant production on an air-dry-matter basis.

Estimates of hay and grazing yields can be calculated from these numbers by multiplying them by a harvest efficiency. A 70 percent harvest efficiency is commonly used when converting to hay yields. Pasture harvest efficiency is highly dependent on the grazing management system applied, ranging from 25 to 50 percent.

Forage Crop

Management Intensity

| | <u>High</u> (lbs/ac) | <u>Low</u> (lbs/ac) |
|---------------------------------|-------------------------|------------------------|
| Alfalfa | 5100 | 2600 |
| Alfalfa/Crested wheatgrass | 4000 | 2100 |
| Alfalfa/Intermediate wheatgrass | 4200 | 2300 |
| Crested wheatgrass | 3700 | 1800 |
| Intermediate wheatgrass | 3900 | 1800 |
| Tall wheatgrass | 3900 | 1800 |
| Western wheatgrass | 2600 | 1300 |

Forage Growth Curves

Growth curves estimate the seasonal distribution of growth of the various forage crops. They indicate when the forages may be available for grazing or mechanical harvest.

Growth Curve Number: ND0001

Growth Curve Name: Alfalfa

Growth Curve Description: Alfalfa

Percent Production by Month

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 0 | 0 | 0 | 5 | 25 | 30 | 20 | 15 | 5 | 0 | 0 | 0 |

Growth Curve Number: ND0002

Growth Curve Name: Cool season grass

Growth Curve Description: Cool season grass

Percent Production by Month

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 0 | 0 | 0 | 5 | 40 | 35 | 10 | 5 | 5 | 0 | 0 | 0 |

Growth Curve Number: ND0003

Growth Curve Name: Warm season grass

Growth Curve Description: Warm season grass

Percent Production by Month

| <u>Jan</u> | <u>Feb</u> | <u>Mar</u> | <u>Apr</u> | <u>May</u> | <u>Jun</u> | <u>Jul</u> | <u>Aug</u> | <u>Sep</u> | <u>Oct</u> | <u>Nov</u> | <u>Dec</u> |
|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| 0 | 0 | 0 | 0 | 10 | 40 | 35 | 15 | 0 | 0 | 0 | 0 |

Soil Limitations

These soils have moderate to severe limitations to the production of climatically adapted forage species. The claypan and soluble salts in the subsoil produce an unfavorable rooting environment, limiting species selection and production potential.

Management Interpretations

The impact on yields can be reduced by selecting forage species that are tolerant of salinity and sodicity and can root in dense, clayey subsoils.

Pasture and hayland can include considerations for wildlife. Delaying grazing on portions of the pasture or rotating pastures will allow nest initiation of grassland nesting birds or species of concern. Nest initiation of most grassland nesting birds occurs from April 15 to June 1. Delaying haying until after July 15 allows for most species to fledge their young. Consider planting species with later maturity to allow for harvesting after nests have fledged. Avoid mowing around the field. Mow back and forth or from the inside to the outside of the field. Consider using flushing bars on swathers and mowers.

FSG Documentation

Similar FSGs:

FSG ID

G055BY210ND

FSG Narrative

Clayey Subsoil soils are less saline and/or sodic and have a more favorable rooting zone.

Inventory Data References:

Agriculture Handbook 296-Land Resource Regions and Major Land Resource Areas
Natural Resources Conservation Service (NRCS) National Water and Climate Center data
USDA Plant Hardiness Zone maps
National Soil Survey Information System (NASIS) for soil surveys in North Dakota and South Dakota counties in MLRA 55B
North Dakota and South Dakota NRCS Field Office Technical Guide
NRCS National Range and Pasture Handbook
Various Agricultural Research Service, Cooperative Extension Service, and NRCS research trials for plant adaptation and production.

State Correlation

This site has been correlated with the following states: North Dakota and South Dakota

Forage Suitability Group Approval

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